

Claims

What is claimed is:

1. In a communication network, a method for evaluating rules, the method
5 comprising the steps of:
 - determining one or more attributes of an entity, at least one of the attributes comprising location of the entity;
 - evaluating one or more rules to produce one or more results, each of the one or more rules comprising one or more functions that operate on the one or more attributes of the
10 entity; and
 - performing, based on the evaluation of the one or more rules, one or more actions specified for the one or more rules, wherein at least one of the actions comprises communicating the one or more results to an application.
- 15 2. The method of claim 1, wherein the one or more functions comprise a plurality of functions combined through logical operators.
3. The method of claim 2, wherein each of the one or more functions evaluates to one of a plurality of states and wherein the rule evaluates to one of the plurality of states.
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4. The method of claim 1, wherein there are a plurality of entities, each entity corresponding to one or more attributes, and wherein the one or more results comprise indications of which entities of the plurality of entities have attributes satisfying the one or more rules.
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5. The method of claim 1, wherein there are a plurality of entities, each entity corresponding to one or more attributes, and wherein the one or more results comprise indications of which entities of the plurality of entities have attributes resulting in a change in status of the evaluation of the one or more rules between a first evaluation of the one or more
30 rules and a second evaluation of the one or more rules.
6. The method of claim 1, wherein the communication network comprises a wireless portion, the entity comprises a wireless device, and the entity communicates within the wireless portion of the communication network.

7. The method of claim 1, wherein:
there are a plurality of entities subscribed to the communication network; and
the step of evaluating is performed by a plurality of nodes in the
5 communication network, each node evaluating rules over a subset of the entities.
8. The method of claim 7, wherein the plurality of entities are registered with the
communication network so as to be able to communicate with portions of the communication
network.
- 10 9. The method of claim 1, further comprising the steps of associating a side
effect with the one or more rules and performing the side effect if the one or more rules
evaluate to a predetermined one of a plurality of states.
- 15 10. The method of claim 1, further comprising the steps of:
receiving a plurality of supplied rules;
determining if evaluation of one or more given rules of the supplied rules
produces one or more constant results for at least a selected time period; and
preventing evaluation of the one or more given rules for the selected time
20 period.
11. The method of claim 10, wherein the step of preventing evaluation further
comprises the step of removing the one or more given rules from the plurality of supplied
rules.
- 25 12. The method of claim 1, wherein the step of determining one or more attributes
of an entity comprises determining the location of the entity.
13. The method of claim 1, wherein the one or more attributes comprise a plurality
30 of attributes, the plurality of attributes further comprising one or more of the following: a
mobile station identification, a user identification, a subscriber class, a bearing, and a speed.

14. The method of claim 1, wherein the communication network comprises a plurality of nodes and wherein each of the plurality of nodes performs the steps of determining, evaluating, and performing one or more actions.
- 5 15. The method of claim 14, wherein the one or more rules comprise a plurality of rules, wherein a plurality of entities are associated with the communication network, and wherein the method further comprises the step of communicating the plurality of rules to each of the nodes.
- 10 16. The method of claim 15, wherein each of the nodes corresponds to a defined coverage region, and wherein the step of evaluating further comprises the step of a given one of the plurality of nodes evaluating rules for entities in a defined coverage region corresponding to the given node.
- 15 17. The method of claim 15, wherein each of the entities has a corresponding set of one or more rules, wherein a given one of the nodes determines which of the plurality of entities are within a coverage region corresponding to the given node, and wherein the given node performs the steps of determining one or more attributes of the entity, evaluating, and performing one or more actions for those nodes of the plurality of nodes that are within the
20 coverage region and does not perform the steps of determining one or more attributes of the entity, evaluating, and performing one or more actions for those nodes of the plurality of nodes that are not within the coverage region.
18. The method of claim 15, wherein a first node corresponds to a first defined
25 coverage region, a second node corresponds to a second defined coverage region, a given entity has persistent data associated with the given entity, and the first node communicates the persistent data to the second node in response to the given entity leaving the first defined coverage region and entering the second defined coverage region.
- 30 19. The method of claim 1, wherein the step of performing one or more actions specified for the one or more rules further comprises the step of sending one or more messages to an application based on the one or more results, the one or more messages corresponding to the one or more results.

20. The method of claim 1, wherein the one or more rules correspond to a plurality of entities, the step of evaluating further comprises the step of evaluating the one or more rules for the plurality of entities to produce one or more results, wherein the one or more results comprise one or more indications as to which of the plurality of entities has attributes satisfying the one or more rules, and wherein the step of performing further comprises the step of communicating one or more messages having the one or more indications to an application.
21. The method of claim 20, wherein the one or more indications comprise a subscriber position record for at least one of the entities meeting the one or more rules.
22. The method of claim 1, wherein the one or more attributes further comprises a subscriber identification, and wherein the one or more rules correspond to one or more geographical regions or one or more subscriber identifications.
23. The method of claim 1, wherein the step of performing, based on the one or more results, one or more actions specified for the one or more rules further comprises the step of communicating a rule-triggered event to the application, wherein the rule-triggered event is specified for the one or more rules and corresponds to the entity.
24. An article of manufacture for evaluating rules, the article of manufacture comprising:
- a computer readable medium containing one or more programs which when executed implement the steps of:
 - determining one or more attributes of an entity, at least one of the attributes comprising location of the entity;
 - evaluating one or more rules to produce one or more results, each of the one or more rules comprising one or more functions that operate on the one or more attributes of the entity; and
 - performing, based on the evaluation of the one or more results, one or more actions specified for the one or more rules, wherein at least one of the actions comprises communicating the one or more results to an application.

25. In a communication network, an apparatus for evaluating spatial rules, the apparatus comprising:
- at least one computer system comprising:
 - one or more memories; and
 - 5 one or more processors coupled to the one or more memories, the one or more processors configured:
 - to determine one or more attributes of an entity, at least one of the attributes comprising location of the entity;
 - to evaluate one or more rules to produce one or more results,
 - 10 each of the one or more rules comprising one or more functions that operate on the one or more attributes of the entity; and
 - to perform, based on the evaluation of the one or more results, one or more actions specified for the one or more rules, wherein at least one of the actions comprises communicating the one or more results to an
 - 15 application.
26. The apparatus of claim 25, wherein the one or more functions comprise a plurality of functions combined through logical operators.
- 20 27. The apparatus of claim 25, wherein there are a plurality of entities, each entity corresponding to one or more attributes, and wherein the one or more results comprise indications of which entities of the plurality of entities have attributes satisfying the one or more rules.
- 25 28. The apparatus of claim 25, wherein there are a plurality of entities, each entity corresponding to one or more attributes, and wherein the one or more results comprise indications of which entities of the plurality of entities have attributes resulting in a change in status of the evaluation of the one or more rules between a first evaluation of the one or more rules and a second evaluation of the one or more rules.
- 30 29. The apparatus of claim 25, wherein the communication network comprises a wireless portion, the entity comprises a wireless device, and the entity communicates within the wireless portion of the communication network.

30. The apparatus of claim 25, wherein:
 there are a plurality of entities subscribed to the communication network;
 the communication system comprises a plurality of nodes;
 the at least one computer system comprises a plurality of computer systems,
5 each node communicating with one or more of the computer systems; and
 each computer system is adapted to evaluate rules over a subset of the entities.
31. The apparatus of claim 25, wherein the processor is further configured:
 to receive a plurality of supplied rules;
10 to determine if evaluation of one or more given rules of the supplied rules
 produces one or more constant results for at least a selected time period; and
 to prevent evaluation of the one or more given rules for the selected time
 period.
- 15 32. The apparatus of claim 25, wherein the one or more attributes comprise a
 plurality of attributes, the plurality of attributes further comprising one or more of the
 following: a mobile station identification, a user identification, a subscriber class, a bearing,
 and a speed.
- 20 33. The apparatus of claim 25, wherein the at least one computer system
 comprises a first plurality of computer systems, the communication network comprises a
 second plurality of nodes, one or more of the nodes communicate with one or more of the
 computer systems, and each of the plurality of computer systems is adapted to determine,
 evaluate, and perform one or more actions.
- 25 34. The apparatus of claim 25, wherein the one or more processors are further
 configured, when performing, to send one or more messages to an application based on the
 one or more results, the one or more messages corresponding to the one or more results.
- 30 35. The apparatus of claim 25, wherein the one or more rules correspond to a
 plurality of entities, the one or more processors are further configured, when evaluating, to
 evaluate the one or more rules for the plurality of entities to produce one or more results,
 wherein the one or more results comprise one or more indications as to which of the plurality
 of entities has attributes satisfying the one or more rules, and wherein the one or more

processors are further configured, when performing, to communicate one or more messages having the one or more indications to an application.